

**IN THE CLAIMS:**

Please cancel claim 36 without prejudice.

- 1 1. (Currently Amended) A method for a file server to allocate a spare disk to replace a failed disk in a network storage system comprising the steps of:
  - 3 identifying a set of spare disks, the set of spare disks attached to a plurality of fil-
  - 4 ers of the network storage system;
  - 5 choosing a best spare disk of the set of spare disks the best spare disk attached to
  - 6 any of the filers of the plurality of filers; and
  - 7 claiming ownership of the best spare disk.
- 1 2. (Original) The method of claim 1 further comprising the steps of:
  - 2 choosing, in response to a failure of the step of claiming ownership, a next best
  - 3 spare disk of the spare disks available; and
  - 4 claiming ownership of the next best spare disk.
- 1 3. (Original) The method of claim 2, wherein the step of claiming ownership of the best
- 2 spare disk further comprises the steps of:
  - 3 setting a first ownership attribute to a file server-owned state; and
  - 4 setting a second ownership attribute to a file server-owned state.

1       4.(Original) The method of claim 1 wherein the step of choosing the best spare disk fur-  
2       ther comprises the steps of:

3               selecting one or more disks from the set of spare disks that satisfy one or more  
4       rules;

5               sorting the one or more disks selected from the set of spare disks according to a  
6       set of ordered policies to identify a highest-ranked disk;

7               choosing a highest-ranked disk as the best spare disk; and

8               choosing, in response to more than one of the one or more disks being highest-  
9       ranked, one disk at random, from the more than one of the one or more disks that are  
10      highest-ranked, as the best spare disk.

1       5. (Original) A method of verifying that a plurality of disks in a volume are optimally  
2       configured comprising the steps of:

3               identifying all of the disks in the volume;

4               obtaining disk characteristics, respectfully, from all of the disks in the volume;

5               comparing the disk characteristics with a set of policies and characteristics of  
6       spare disks; and

7               alerting an administrator if a more optimal configuration is possible.

1       6. (Original) The method of claim 5 further comprising the step of:  
2               reconfiguring the disks into a more optimal configuration.

1 7. (Currently Amended) A method of selecting a best spare disk for use by a ~~file~~  
2 ~~server~~filer in a network storage system including a plurality of filers, and serving an array  
3 of disks from a set of spare disks comprising the steps of:  
4       selecting one or more disks from the set of spare disks attached to any of the filers  
5 of the plurality of filers, said set of disks satisfying that satisfy one or more rules;  
6       sorting the one or more disks using a set of ordered policies;  
7       if only one disk is highest-ranked, selecting the one disk that is highest-ranked as  
8 the best spare disk; and  
9       if a plurality of disks are highest-ranked, selecting one of the disks from the plu-  
10 rality of disks that are highest-ranked as the best spare disk.

1 8. (Currently Amended) A network storage system comprising:  
2       one or more switches;  
3       a plurality of spare disks operatively interconnected through at least one of the  
4 switches; and  
5       one or more file servers operatively interconnected to at least one of the switches,  
6 each of the file servers including means for allocating one of the plurality of spare disks  
7 to any of the servers.

1 9. (Original) The network storage system of claim 8, wherein the means for allocat-  
2 ing one or more of the plurality of spare disks further comprises:  
3       means for identifying the plurality of spare disks;

4       means for selecting a best spare disk from the plurality of spare disks; and  
5       means for claiming ownership of the best spare disk.

1       10. (Original) The network storage system of claim 9, wherein the means for selecting a  
2       best spare disk from the plurality of spare disks further comprises:  
3           means for selecting a set of disks from the plurality of spare disks that satisfy one or  
4           more rules;  
5           means for sorting the set of disks according to a set of ordered policies; and  
6           means for selecting a highest-ranked disk from the set of disks.

1       11. (Currently Amended)    A computer-readable medium, including program instruc-  
2       tions executing on a ~~file server~~filer, for allocating a replacement disk to the ~~file server~~-  
3       filer, the program instructions performing the steps of:  
4           identifying a set of spare disks the set of spare disks attached to a plurality of fil-  
5       ers of the network storage system;  
6           choosing a best spare disk of the set of spare disks the best spare disk attached to  
7       any of the plurality of filers; and  
8           claiming ownership of the best spare disk.

1       12. (Original) The computer-readable medium of claim 11, wherein the step of choosing  
2       the best spare disk further comprises the steps of:

3       selecting one or more disks from a set of spare disks that satisfy one or more  
4    rules;  
5       sorting the one or more disks selected from the set of spare disks according to a  
6    set of ordered policies to identify a highest-ranked disk;  
7       choosing a highest-ranked disk as the best spare disk; and  
8       choosing, in response to more than one of the one or more disks being highest-  
9    ranked, one disk at random, from the more than one of the one or more disks that are  
10    highest-ranked, as the best spare disk.

1    13. (Previously Presented) A method for allocating a spare disk to replace a failed disk  
2    in a network storage system, comprising:  
3       maintaining a plurality of volumes in the network storage system, each volume  
4    associated with a set of disk storage units;  
5       maintaining a plurality of spare disks in the network storage system;  
6       choosing a best spare disk of the plurality of spare disks to replace a failed disk,  
7    the failed disk associated with any volume of the network storage system; and  
8       replacing the failed disk with the best spare disk.

1    14. (Previously Presented) The method as in claim 13, further comprising:  
2       establishing at least one file server in the network storage system; and  
3       performing the step of choosing a best spare disk by the at least one file server.

1 15. (Previously Presented) The method as in claim 13, further comprising:  
2       establishing at least one file server in the network storage system; and  
3       performing the step of replacing the failed disk with the best spare disk by the file  
4 server.

1 16. (Previously Presented) The method as in claim 13, further comprising:  
2       determining the best spare disk by selecting those disks from the plurality of spare  
3 disks which meet at least one selected rule.

1 17. (Previously Presented) The method as in claim 13, further comprising:  
2       sorting disks in accordance with policies, and assigning a score to each disk as a  
3 result of the sorting; and  
4       selecting the disk with a highest score as the best spare disk.

1 18. (Previously Presented) The method as in claim 13, further comprising:  
2       determining those disks of the plurality of spare disks which meet at least one se-  
3 lected rule to form a selected pool of disks;  
4       sorting disks of the selected pool of disks in accordance with policies, and assign-  
5 ing a score to each disk as a result of the sorting; and  
6       selecting the disk with a highest score as the best spare disk.

1 19. (Previously Presented) The method as in claim 13, further comprising:

2           using a random selection process to select the best spare disk in the event that two  
3    or more disks appear to be equally the best spare disk.

1   20. (Previously Presented) A method for allocating a spare disk to replace a failed disk in  
2   a network storage system, comprising:

3           maintaining a plurality of volumes in the network storage system, each volume  
4    associated with a set of disk storage units;  
5           maintaining a plurality of spare disks in the network storage system;  
6           attempting to determine the best spare disk by selecting those disks from the plu-  
7    rality of spare disks which meet at least one rule;  
8           replacing the failed disk with the best spare disk;  
9           in the event that no spare disk meets the at least one rule, selecting a spare disk  
10   which violates the at least one rule as a selected disk; and  
11           notifying an administrator that the selected spare disk violates the rule.

1   21. (Previously Presented) A network storage system, comprising:

2           means for maintaining a plurality of volumes in the network storage system, each  
3    volume associated with a set of disk storage units;  
4           means for maintaining a plurality of spare disks in the network storage system;  
5           means for choosing a best spare disk of the plurality of spare disks to replace a  
6    failed disk, the failed disk associated with any volume of the network storage system; and  
7           means for replacing the failed disk with the best spare disk.

- 1 22. (Previously Presented) The network storage system of claim 21, further comprising:
  - 2 means for establishing at least one file server in the network storage system; and
  - 3 means for performing the step of choosing a best spare disk by the at least one file
  - 4 server.
- 1 23. (Previously Presented) The network storage system of claim 21, further comprising:
  - 2 means for establishing at least one file server in the network storage system; and
  - 3 means for performing the step of replacing the failed disk with the best spare disk
  - 4 by the file server.
- 1 24. (Previously Presented) The network storage system of claim 21, further comprising:
  - 2 means for determining the best spare disk by selecting those disks from the plural-
  - 3 ity of spare disks which meet at least one selected rule.
- 1 25. (Previously Presented) The network storage system of claim 21, further comprising:
  - 2 means for sorting disks in accordance with policies, and assigning a score to each
  - 3 disk as a result of the sorting; and
  - 4 means for selecting the disk with a highest score as the best spare disk.
- 1 26. (Previously Presented) The network storage system of claim 21, further comprising:

2       means for determining those disks of the plurality of spare disks which meet at  
3       least one selected rule to form a selected pool of disks;  
4       means for sorting disks of the selected pool of disks in accordance with policies,  
5       and assigning a score to each disk as a result of the sorting; and  
6       means for selecting the disk with a highest score as the best spare disk.

1   27. (Previously Presented) The network storage system of claim 21, further comprising:  
2       means for using a random selection process to select the best spare disk in the  
3       event that two or more disks appear to be equally the best spare disk.

1   28. (Previously Presented) A network storage system, comprising:  
2       means for maintaining a plurality of volumes in the network storage system, each  
3       volume associated with a set of disk storage units;  
4       means for maintaining a plurality of spare disks in the network storage system;  
5       means for attempting to determine a best spare disk by selecting those disks from  
6       the plurality of spare disks which meet at least one rule;  
7       means for replacing the failed disk with the best spare disk;  
1       in the event that no spare disk meets the at least one rule, means for selecting a  
2       spare disk which violates the at least one rule as a selected disk; and  
3       means for notifying an administrator that the selected spare disk violates the rule.

1   29. (Previously Presented) A file server in a network storage system, comprising:

2           a storage adapter to connect to a plurality of disk storage units in the network  
3   storage system;  
4           an operating system to maintain a plurality of volumes, each volume associated  
5   with a set of disk storage units, the set of disk storage units selected from the plurality of  
6   disk storage units;  
7           the operating system maintaining a plurality of spare disks units selected from the  
8   plurality of disk storage units;  
9           the operating system choosing a best spare disk of the plurality of spare disks to  
10   replace a failed disk, the failed disk associated with any volume of the network storage  
11   system; and  
12           the operating system replacing the failed disk with the best spare disk.

1   30. (Previously Presented) The file server of claim 29, further comprising:  
2           the operating system determining the best spare disk by selecting those disks from  
3   the plurality of spare disks which meet at least one selected rule.

1   31. (Previously Presented) The file server system of claim 29, further comprising:  
2           the operating system sorting disks in accordance with policies, and assigning a  
3   score to each disk as a result of the sorting; and  
4           the operating system selecting the disk with a highest score as the best spare disk.

1   32. (Previously Presented) The file server system of claim 29, further comprising:

2           the operating system determining those disks of the plurality of spare disks which  
3    meet at least one selected rule to form a selected pool of disks;  
4           the operating system sorting disks of the selected pool of disks in accordance with  
5    policies, and assigning a score to each disk as a result of the sorting;  
6           the operating system selecting the disk with a highest score as the best spare disk.

1    33. (Previously Presented) The file server of claim 29, further comprising:  
2           the operating system using a random selection process to select the best spare disk  
3    in the event that two or more disks appear to be equally the best spare disk.

1    34. (Previously Presented) A file server in a network storage system, comprising:  
2           a storage adapter to connect to a plurality of disk storage units in the network  
3    storage system;  
4           an operating system to maintain a plurality of volumes, each volume associated  
5    with a set of disk storage units, the set of disk storage units selected from the plurality of  
6    disk storage units;  
7           the operating system maintaining a plurality of spare disks units selected from the  
8    plurality of disk storage units;  
9           the operating system choosing a best spare disk of the plurality of spare disks to  
10   replace a failed disk, the failed disk associated with any volume of the network storage  
11   system;

12           the operating system attempting to determine a best spare disk by selecting those  
13           disks from the plurality of spare disks which meet at least one rule;  
14           the operating system replacing the failed disk with the best spare disk;  
15           in the event that no spare disk meets the at least one rule, the operating system se-  
16           lecting a spare disk which violates the at least one rule as a selected disk; and  
17           the operating system notifying an administrator that the selected spare disk vio-  
18           lates the rule.

1       35. (Previously Presented) A computer readable media, comprising:  
2           said computer readable media containing instructions for execution on a processor  
3           for the practice of a method for allocating a spare disk to replace a failed disk in a net-  
4           work storage system, the method having the steps of,  
5           maintaining a plurality of volumes in the network storage system, each volume  
6           associated with a set of disk storage units;  
7           maintaining a plurality of spare disks in the network storage system;  
8           choosing a best spare disk of the plurality of spare disks to replace a failed disk,  
9           the failed disk associated with any volume of the network storage system; and  
10           replacing the failed disk with the best spare disk.

1       36. (Cancelled)